Stream Quality Monitoring 2013 Annual Report
Little Beaver Creek State & National Wild & Scenic River

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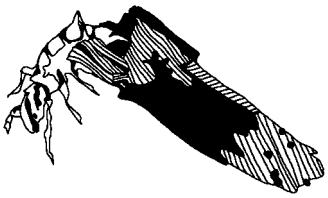


Ohio Scenic Rivers Program

With more than 60,000 miles of streams, Ohio is a water-rich state. Many of Ohio's streams support thriving plant and animal communities, including Ohio's state designated scenic rivers. Administered by the Ohio Division of Watercraft, the Ohio Scenic Rivers Program oversees 14 state designated scenic river systems, comprising 800 river miles along 26 stream segments. These streams represent some of the best of Ohio's waterways.

Stream Quality Monitoring Project

Developed in 1983, the Ohio Stream Quality Monitoring (SQM) Project uses volunteers who assist in aquatic macroinvertebrate monitoring to compile biological and water quality data on the state's scenic rivers. The Ohio SQM project is an excellent, simple, and cost-effective method of assessing a stream's health.

Aquatic macroinvertebrate organisms lack a backbone (invertebrate), are large enough to view with the naked eye (macro), and spend at least a portion of their lives in the water (aquatic). Macroinvertebrates, such as various aquatic insects (e.g. mayfly, stonefly), are good indicators of stream health. When negative impacts to a stream occur, the result may show a decline or absence of certain macroinvertebrate species.

Through consistent monitoring, changes observed in the macroinvertebrate community help the Ohio Scenic Rivers Program in detecting and addressing potential impacts to a stream. The Ohio Scenic Rivers Program compiles volunteer field assessment information into a statewide database. The database serves as a tool to track short- and long-term changes and trends over time.

SQM Project Relies on Volunteers

Coordinated by the Division of Watercraft's Scenic Rivers Program, the Ohio SQM Project provides opportunities for public participation in scenic river protection efforts. Many local, youth and conservation organizations, individuals, and families are committed to monitoring more than 150 stations along Ohio's scenic rivers.

SQM volunteers collect macroinvertebrate data from selected monitoring stations, also referred to as monitoring sites or reference stations, three times during the monitoring season. Volunteers complete field assessment forms that document taxonomy, tolerance, and abundance of collected organisms.

SQM Annual Report

The information collected by volunteers has become a critical tool for documenting the health of Ohio's state scenic, wild, and recreational rivers. This report is a compilation of field data collected during 2013 by volunteers and staff. It also represents a year of dedication and commitment shown to Ohio's special waterways by thousands of SQM volunteers.

Overview

Flowing through some of Ohio's wildest and most scenic areas, Little Beaver Creek in Columbiana County was the first in Ohio to be designated a wild river by the Ohio Department of Natural Resources on January 15, 1974. Little Beaver Creek is one of only three rivers in Ohio that have been designated a National Scenic River.

Little Beaver Creek is a river of deep valleys, wooded slopes, and occasional rock outcroppings. The river is boulder-strewn, consisting of fast-flowing rapids, riffles, and quiet pools that are fed by clear swift-flowing tributaries. It is a river of great diversity relatively untouched by development. In addition to a diverse macroinvertebrate population, Little Beaver Creek supports 63 species of fish, 49 mammal species, 140 types of birds, and 46 species of reptiles and amphibians. Ohio's largest population of the endangered Hellbender salamander resides in Little Beaver Creek.

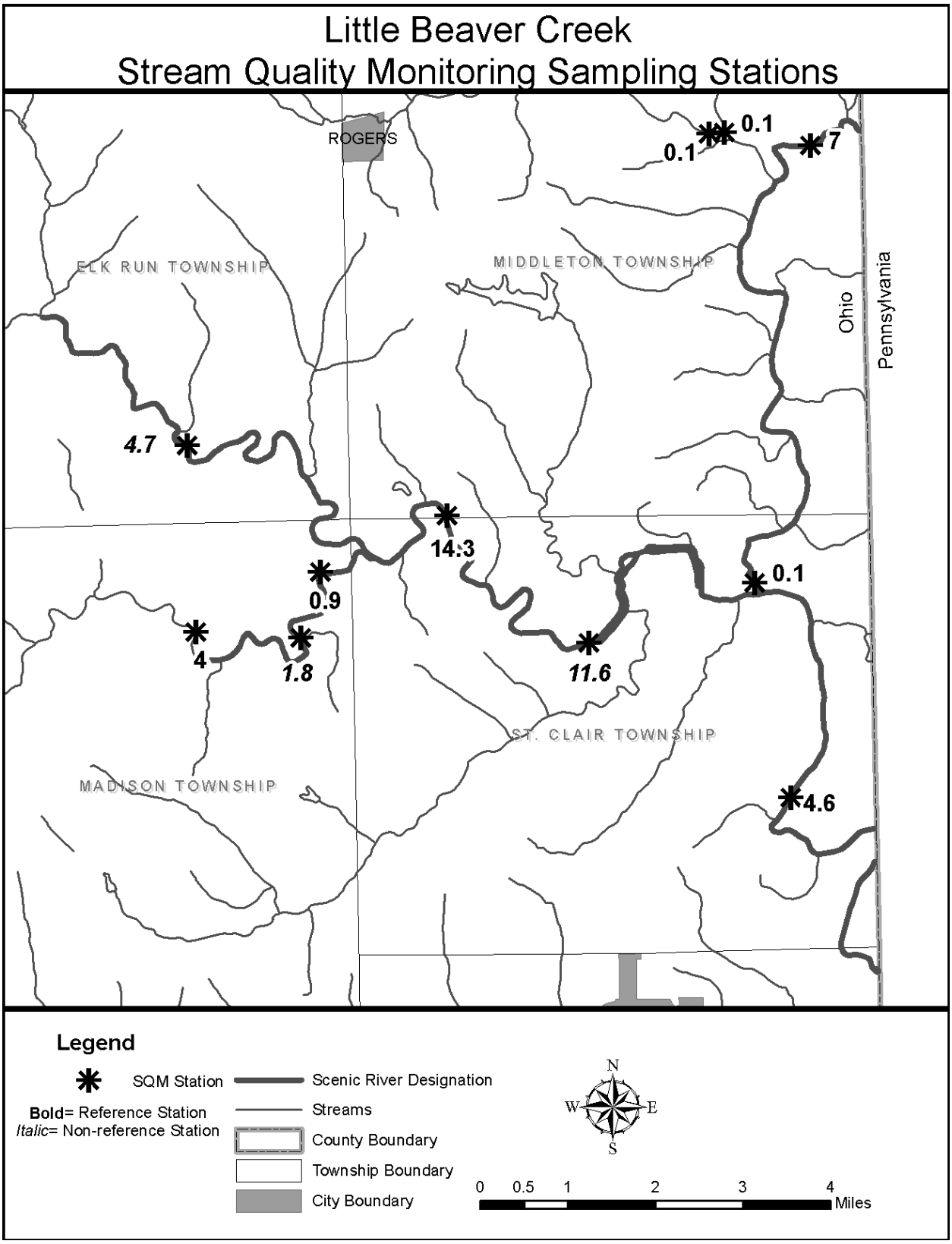
Glaciers once covered the northern-most portion of the watershed. The varying depths of deposited glacial drift create the impression of a high, flat plain, and bedrock is exposed only along eroded stream valleys and on former ridge tops. Glacial moraines, "ridges" that mark the southern-most advance of the glaciers, influenced topography in the middle portion of the watershed. Moraines are evident today as gentle upper slopes and steep lower slopes leading to the river. The river valley appears gorge-like, with visible sandstone, shale, and coal bedrock.

Unaffected by glaciers, the southern portion of the watershed is very different. The landscape is hilly and rugged with the stream flowing 300-400 feet below. Steep topography in the region inhibits development and allows the river to retain its wild and natural character. However, the abundance of coal in the region is evidenced by strip mines. Fortunately, few of the mining areas are visible from the river.

History abounds in the Little Beaver Creek Valley. A historical marker now identifies the spot where, in 1785, Thomas Hutchins began the first U.S. Public Land Survey. At the time, this was the greatest subdivision of land in America and represented the first time that land was surveyed prior to being sold. In 1848, the Sandy and Beaver Canal, linking the Ohio River with the Ohio-Erie Canal, was completed with 30 dams, 90 locks and two tunnels. Remnants of the once thriving canal system are well preserved throughout the region.

Efforts to protect the Little Beaver Creek include the acquisition and protection of Sheepskin Hollow State Nature Preserve by the Ohio Division of Watercraft and 1,350 acres of conservation easement, purchased through a cooperative effort of DNAP and the Columbiana Soil and Water Conservation District. In 1999, the ODNR Division of Forestry purchased 1,100 acres in the watershed to create Beaver Creek State Forest. Beaver Creek State Park consists of more than 3,000 acres and is managed by ODNR Division of Parks and Recreation. Beaver Creek State Park provides numerous recreational opportunities and much needed protection for the Little Beaver Creek watershed. Additional preservation partners include the Little Beaver Creek Land Foundation, a non-profit land trust that has successfully protected several properties in the watershed.

These partners along with the Scenic River Program are working together with landowners to acquire additional conservation easements that will also be invaluable for the future preservation of this wild and scenic river known as Little Beaver Creek. For more information about Little Beaver Creek, please contact the Northeast Ohio Regional Scenic River Manager at 330-872-0040.


Little Beaver Creek
Stream Quality Monitoring Sampling Stations
ROGERS
ELK RUN TOWNSHIP
MIDDLETON TOWNSHIP
ST. CLAIR TOWNSHIP
MADISON TOWNSHIP
Ohio
Pennsylvania
0.1
0.1
7
4.7
14.3
0.9
0.1
4
1.8
11.6
4.6
Legend
SQM Station
Bold= Reference Station
Italic= Non-reference Station
Scenic River Designation
Streams
County Boundary
Township Boundary
City Boundary
N
W
E
S
0 0.5 1 2 3 4
Miles

2013 Stream Quality Monitoring Participants

Whether their contribution was a one-time event or a recurring adventure in stream exploration, the individuals and organizations listed below played a significant role in protecting Little Beaver Creek. Their time and dedication to this river and the Ohio SQM Project is greatly appreciated. Special thanks go to the Little Beaver Creek Wild & Scenic River Advisory Council for their continued support and assistance.

Little Beaver Creek - Mainstem

River Mile 4.6 - Grimm's Bridge
Barb and Aaron Slagle
Jamie Webber & Family

River Mile 11.6 - Sprucevale (*non-reference station*)
Gregg Melfe - Pete Moss & Family

River Mile 14.3 - Gaston's Mill
Janet and Rick Williams
Watercraft SQM Volunteer Training Workshop
Barb and Aaron Slagle
Bob,Sara and Audrey Syppko
Kathy Cattrell – Crestview HS Biology

Little Beaver Creek - Bull Creek

River Mile 1.0 – State Route 154 Bridge Crossing
Crestview High School Biology - Kathy Cattrell

Little Beaver Creek - Leslie Run

River Mile 0.1 – State Route 154 Bridge Crossing
Butch and Denise MacAleese- Gina Gulutz

Little Beaver Creek - North Fork

River Mile 0.1 - Fredericktown Bridge
Gregg Melfe - Pete Moss & Family

River Mile 7.0 - State Route 154 Bridge Crossing
Ron Novak

Little Beaver Creek - West Fork

River Mile 0.9 – State Route 7 Bridge
Joe and Sean Helpy

River Mile 1.8 - Beaver Local High School (*non-reference station*)
No samples were recorded at this location during 2012.

River Mile 4.0 – VFW Camp
Lisbon Junior Farmers 4-H Club - Cathy French

Little Beaver Creek - Middle Fork

River Mile 4.7 - Lusk Lock (*non-reference station*)

Chuck Henry- Gina Gulutz

The continued success of the Ohio SQM Project depends on the commitment and dedication of these (and other) volunteers and participants. We would like to recognize volunteers *Kathy Cattrell; Pete Moss and Family; and Rick & Janet Williams* for monitoring three times or more during the season. If you would like to become a volunteer, please contact the Northeast Ohio SQM Coordinator at 330-872-0040.

Station Descriptions

Due to the remoteness of Little Beaver Creek, public access is somewhat limited. Most of the SQM stations along Little Beaver Creek are located on either public property or in areas adjacent to bridge crossings. Generally, monitoring stations have been selected due to their suitable macroinvertebrate habitat and public access. The following are brief descriptions of the selected stream quality monitoring sites along the Little Beaver Creek.

Little Beaver Creek - Mainstem

River Mile 4.6 - Grimm's Bridge

This station is located approximately 300 yards upstream from Grimm's Bridge and represents the farthest downstream sampling station on Little Beaver Creek. Parking for a few cars is limited to a wide spot on Grimm's Bridge Road and access to the river is difficult due to the steep riverbank.

The riffle is about 100 feet wide and comprises cobblestones and small moveable boulders. Areas with the highest biodiversity are located in the deeper parts of the riffle, sustaining a relatively constant flow throughout the year.

River Mile 11.6 - Sprucevale, Beaver Creek State Park (*non-reference station*)

Located within Beaver Creek State Park, there is ample parking and access to the river is ideal. The area is similar in character to the upstream sampling site also located within the park.

Substrate, partially comprised of gravel and cobblestone, provide excellent habitat for aquatic insects.

River Mile 14.3 - Gaston's Mill, Beaver Creek State Park

Located in the first riffle area downstream from the iron bridge, this sampling station is located in the Gaston's Mill area of Beaver Creek State Park. Parking and public access to the river is excellent. Annually, the Scenic Rivers Program conducts its SQM Training Workshop and Stream Life Day activities at this location.

The streambed composition comprises cobbles and boulders as well as a mixture of sand and gravel, creating an ideal location for the macroinvertebrate community.

Little Beaver Creek - North Fork

River Mile 0.1 - Fredericktown Bridge

The riffle area at this sampling station is located under the iron bridge in historic Fredericktown. The area is privately owned and permission must be acquired prior to parking and accessing the river. If you are interested in visiting this site, please contact the NE Ohio Regional Scenic River Manager at 330-872-0040 at least seven days prior to your visit.

The riffle area differs from others on the Little Beaver Creek in that sampling can only be done where cobbles and boulders have collected in the depression of bedrock furrows. The remainder of the riffle is smooth bedrock. Although habitat is less than ideal, good to excellent ratings are obtained consistently from this station. Due to slippery bedrock and high water velocity in the riffles, samplers must exercise caution when wading here.

River Mile 7.0 - State Route 154 Bridge Crossing, East of Negley
State Route 154 crosses Little Beaver Creek east of Negley near the Ohio-Pennsylvania state line. The highway right-of-way provides a place to park for access to the riffle area upstream from the bridge. Access down the steep embankment can be difficult so use caution.

The riffle area is comprised mainly of cobbles, gravel, and some fine sand and silt.

Little Beaver Creek - West Fork

River Mile 0.9 - State Route 7 Crossing
This sampling station is located approximately one-third of a mile upstream from the State Route 7 bridge crossing. Parking is available on the highway right-of-way and access to the creek is down a very steep embankment. Unusually large stonefly nymphs (pollution intolerant organisms) have been collected at this site.

The riffle is comprised mostly of large cobblestones and gravel. The aquatic sampler can expect to find a wide variety of organisms at this location.

River Mile 4.0 - VFW Camp, Township Road 914
This site is located on private property and permission from the VFW is required. This sampling station also marks the beginning of the “wild” designation for the Little Beaver Creek. During normal to low flow, the riffle area is only 15- to 20-feet wide.

The streambed composition is made up of boulders and cobblestones along with a small percentage of sand and gravel. Large dobsonfly larvae, ranging from three to four inches, consistently are found at this location, which is an indicator of excellent water quality.

Little Beaver Creek - Middle Fork

River Mile 4.7 - Lusk Lock, Beaver Creek State Park (*non-reference station*)
The station is located upstream of the historic Lusk Lock in Beaver Creek State Park. A relatively long walk is involved to arrive at this area. Cobblestones are the dominant substrate at this location..

Little Beaver Creek - Leslie Run

River Mile 0.10 - State Route 154 Crossing
Leslie Run is a tributary to Bull Creek, which parallels State Route 170 as it runs from East Palestine to the south towards Negley. The monitoring station is located immediately upstream of the State Route 154 bridge crossing. At low flow, the stream is approximately six inches deep.

The riffle area is composed mostly of gravel and sand and has historically received very low CIVs. However, since improvements were completed at the East Palestine Wastewater Treatment Plant, water quality in Leslie Run is gradually improving.

Little Beaver Creek - Bull Creek

River Mile 1.0 - State Route 154 Bridge Crossing
Bull Creek is a tributary to the North Fork of Little Beaver Creek. The sampling station is located immediately downstream of the State Route154 Bridge. Parking and access to the river is from the highway right-of-way.

Although some bedrock is evident on the stream bottom, the riffle area also possesses a good mixture of cobblestones and gravel. This provides excellent habitat for macroinvertebrates.

2013 Sampling Results and General Trends

The 2013 Stream Quality Monitoring season proved to be a challenge for volunteers. According to the National Oceanic and Atmospheric Administration (NOAA), northeast Ohio received 6 inches over average precipitation between May and October. Rainfall amounts made it difficult for data to be collected by volunteers at reference sites and prolonged high water conditions made it difficult for volunteers to get their areas sampled. High water velocity disrupts the macroinvertebrate community by tumbling the cobbles and gravel on the river bottom. After episodes of high water, several weeks may pass before disturbed riffle areas are re-colonized by macroinvertebrates. Additionally, staffing changes during the 2013 sampling season meant that very few reference sites were monitored. The SQM Project requires a minimum of 3 readings to calculate a Cumulative Index Value (CIV), with a minimum of 30 days between each sample. Despite heavy rains in June, Little Beaver Creek received average precipitation throughout the summer and fall sampling seasons. Stream Quality Monitoring sample results for Little Beaver Creek ranged from good to excellent. Overall, the 2013 sampling results from Little Beaver Creek indicate an excellent diversity of insects, especially the pollution-sensitive species (e.g. stonefly, damselfly, mayfly, etc.)

In Little Beaver Creek, volunteers and ODNR staff conducted 28 assessments at 8 official monitoring sites in 2013. Little Beaver Creek recorded an average CIV of 26, corresponding to the excellent range for water quality. The average slightly increased from the 2012 average of 24. The average taxonomic diversity for Little Beaver Creek per assessment was 11 macroinvertebrate orders.

Overall, the surveyed portion of Little Beaver Creek has a good to excellent diversity of macroinvertebrates. However, continued efforts from local and state officials are needed to protect the water quality and aquatic diversity of Little Beaver Creek. Individuals are also encouraged to work closely with their local officials towards protecting the Wild and Scenic Little Beaver Creek.

Data collected by SQM volunteers and ODNR staff is used as a water-quality screening method. The data helps to detect significant changes in stream quality based on CIV data from sites monitored for many years. If there is a significant decline in the average CIV, potential problems that may be causing stream degradation can be investigated and addressed.

The staff of the Ohio Scenic Rivers Program appreciates the assistance we received from our dedicated volunteer monitors. It is only through their efforts that it was possible to complete the SQM samples on Little Beaver Creek during 2013. Working together has produced significant results but more help is needed. For more information please contact the Northeast Stream Quality Monitoring Coordinator 330-770-0972.

Total Suspended Solids (TSS)

In 1999, the Scenic River Program added Total Suspended Solids (TSS) monitoring to the Ohio SQM Project. The purpose of this addition is to estimate the amount of soil sediments affecting a stream by estimating the turbidity of the water. These sediments are attributed to problems originating upstream of the sampling site. The equipment is calibrated to predict TSS at 90% accuracy. The measurements are accurate enough to determine the changes in sediment rates in a stream at a given location and time.

Variables such as amount of precipitation, slope and gradient of the river system, soil type, time of year data is collected, amount of development, amount of riparian corridor, velocity of the river flow and the amount of waste water effluent have an effect on the TSS value.

Precipitation amount is important because of the increased potential for sediments to be carried into the river during a rain event. The TSS value may appear higher than normal if precipitation amounts are not taken into account. Since large rain events usually happen in the spring and early summer, the time of year the samples are taken could affect the TSS score. The gradient of the stream is important as well. Sediments do not settle out as easily in high gradient streams because the velocity of the water washes it downstream. In low gradient streams, sediment has a chance to settle out, resulting in a lower TSS value. Soil types affect TSS values because some soil types erode faster than others. A better understanding of the types of soils within the watershed may give way to a better understanding of the baseline TSS values for a stream.

Development in an area can cause changes in the TSS score. Areas cleared for new buildings are often not covered, causing an acute rise in the amount of suspended solids in nearby streams. Impermeable surfaces can also cause chronic elevation of TSS values because there is no buffer to absorb or trap runoff. Wastewater treatment plant effluent would only affect TSS scores in low flow situations, and only if the plant employs only primary or secondary treatment.

The actual process of taking a sample is simple. Using a clear Lucite sediment stick developed by the Lake Soil and Water Conservation District, a water sample is collected from the stream. Keeping the sample materials suspended, water is then poured out of the tube until the 0.4-inch target dot is visible on the tube bottom. A reading of the water column height is taken from the markings on the stick to the nearest ¼ inch. A conversion table is then used to convert the sediment stick reading to a TSS measurement in the form of an estimate of the weight of solids suspended in the water column (mg/l).

The TSS measurement can be used to estimate water quality with the following scale:

TSS < 10 mg/l = excellent water quality
TSS 10-28 mg/l = normal water quality
TSS 29-133 mg/l = impaired water quality
TSS > 133 mg/l = severely impacted water quality

2013 TSS Results: Overall, there were a total of 27 TSS readings taken in Little Beaver Creek.

Little Beaver Creek - Mainstem had a median reading of <6.2 mg/L corresponding to the excellent range. A data set range for this station does not exist for 2013 as all samples performed resulted in < 6.2 mg/L of total suspended solids.

Little Beaver Creek - West Fork had a median reading of <6.2 mg/L corresponding to the excellent range. The data set ranged from <6.2 mg/L to 8.0 mg/L of total suspended solids.

Little Beaver Creek - Leslie Run had a median reading of <6.2 mg/L of TSS corresponding to the excellent range. A data set range for this station does not exist for 2013 as all samples performed resulted in < 6.2 mg/L of total suspended solids.

Little Beaver Creek - North Fork had a median reading of <6.2 mg/L corresponding to the excellent range. A data set range for this station does not exist for 2013 as all samples performed resulted in < 6.2 mg/L of total suspended solids.

Little Beaver Creek - Bull Creek had a median reading of <6.2 mg/L of TSS corresponding to the excellent range. A data set range for this station does not exist for 2013 as all samples performed resulted in < 6.2 mg/L of total suspended solids.

Comparisons of Collected Stream Quality Monitoring Data

Monitoring of the same reference station is performed a minimum of three times per year, consistently year after year. An assessment of the diversity and tolerance levels of taxonomy collected generates the Cumulative Index Value (CIV) for the site on a given date. Field assessment results are used as basic indicators of long-term changes in a stream's macroinvertebrate community and help Scenic Rivers staff identify pronounced stream quality problems.

Table 1 identifies the 20 macroinvertebrates assessed and their general tolerance to pollutants. Pollution-intolerant organisms, such as those listed in Group I, require unpolluted, high quality water in order to survive. Pollution-tolerant organisms, such as those listed in Group III, are extremely tolerant of deteriorated water conditions.

Table 1. Macroinvertebrate Pollution Tolerance

Group I Taxa Pollution Intolerant	Group II Taxa Moderately Tolerant	Group III Taxa Pollution Tolerant
Water Penny Beetle Larvae (WP) Mayfly Nymphs (MF) Stonefly Nymphs (ST) Dobsonfly Larvae (DO) Caddisfly Larvae (CD) Riffle Beetle Adult (RI) Other Snails (OS)	Damselfly Nymphs (DA) Dragonfly Nymphs (DR) Crane Fly Larvae (CR) Beetle Larvae (BL) Crayfish (CF) Scuds (SC) Clams (CL) Aquatic Sowbugs (SW)	Black Fly Larvae (BF) Aquatic Worms (AW) Midge Larvae (MI) Pouch Snails (PS) Leeches (LE)

Tables 2 through 6 represent the average CIVs for each SQM reference station sampled on the river during 2013. In addition, the table uses symbols (◆) to indicate those macroinvertebrates found to be present at least once during the year at the respective reference station. Each macroinvertebrate is identified by a two-letter code from Table 1. CIVs of 23 or greater indicate *Excellent* stream quality; CIVs of 17-22 indicate *Good* stream quality; CIVs ranging from 11-16 suggest *Fair* stream quality; and CIVs of 10 or less reflect *Poor* stream quality. Situated beside the CIVs are the symbols + (improved), = (equal), or – (declined) indicating the relationship to the previous years CIVs.

For the full range of CIVs attained at all sites monitored during the year, including non-reference stations, please see the Appendix.

Table 2. Little Beaver Creek - Mainstem 2013 Mean CIVs by Reference Station

Station	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
4.6	◆	◆	◆	◆	◆	◆	◆				◆	◆	◆			◆		◆			X
14.3	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		◆	◆	◆		◆	26+

Table 3. Little Beaver Creek - Bull Creek 2013 Mean CIV by Reference Station

Station	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
1.0	◆	◆	◆	◆	◆	◆		◆	◆	◆		◆					◆	◆			23+

Table 4. Little Beaver Creek - Leslie Run 2013 Mean CIV by Reference Station

Station	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
0.1	◆	◆	◆	◆	◆	◆			◆	◆	◆	◆			◆	◆	◆	◆		◆	24+

Table 5. Little Beaver Creek - North Fork 2013 Mean CIVs by Reference Station

Station	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
0.1	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		◆	◆	◆			29+
7.0	◆	◆	◆	◆	◆	◆	◆				◆	◆		◆		◆	◆	◆			X

Table 6. Little Beaver Creek - West Fork 2013 Mean CIVs by Reference Station

Station	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
0.9	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆		◆	◆	◆			30+
4.0		◆	◆	◆	◆					◆	◆	◆		◆		◆		◆			X

Figures 1.1 – 1.5 represent the maximum and minimum range of CIVs recorded during the year for each reference station. Figures 2.1 – 2.5 represent the mean CIVs at each reference station over many years.

Figure 1.1 Little Beaver Creek - Mainstem 2013 CIV Maximum and Minimum Ranges

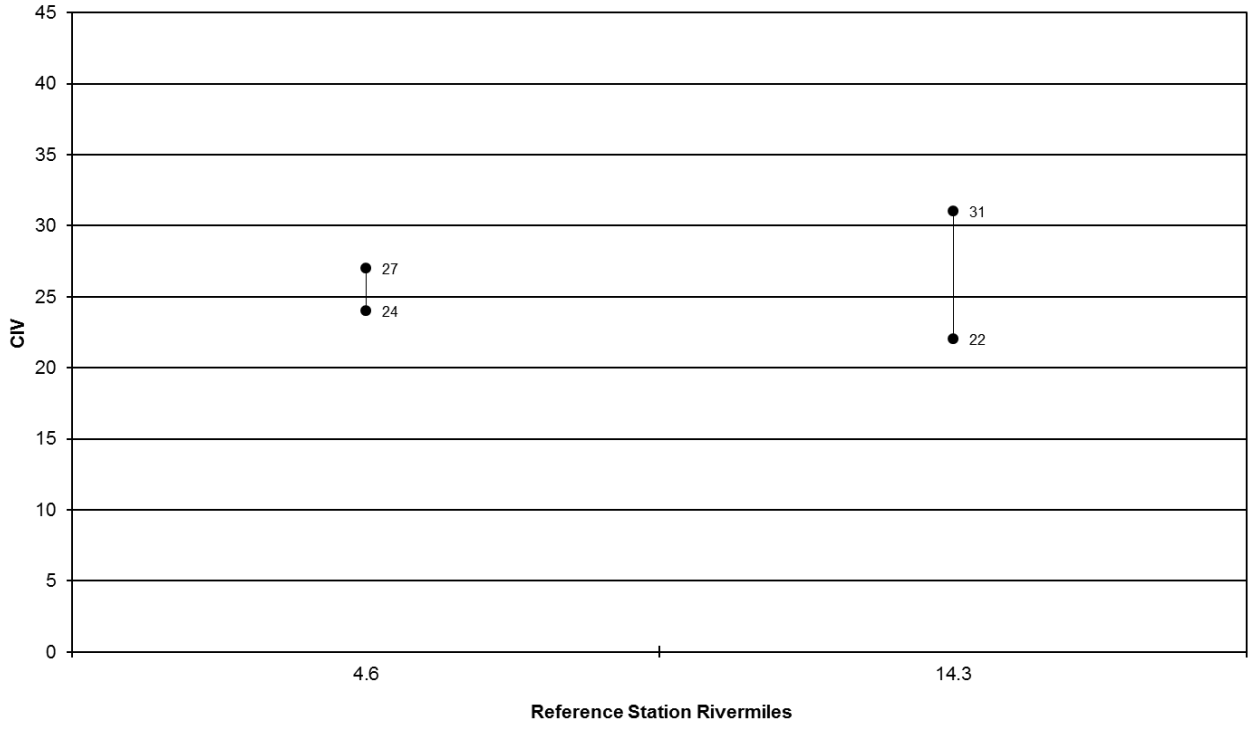


Figure 2.1 Little Beaver Creek - Mainstem 2003 - 2013 Mean CIVs

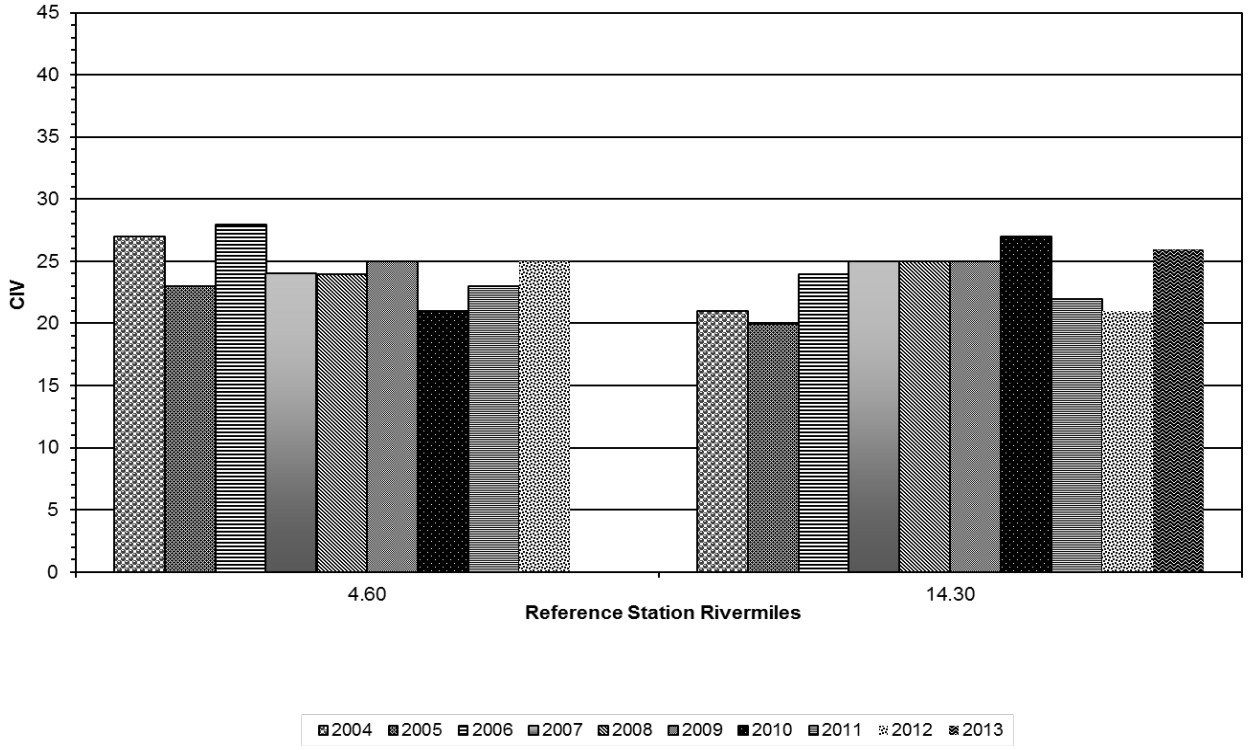


Figure 1.2 Little Beaver Creek - Bull Creek 2013 Maximum and Minimum CIV Range

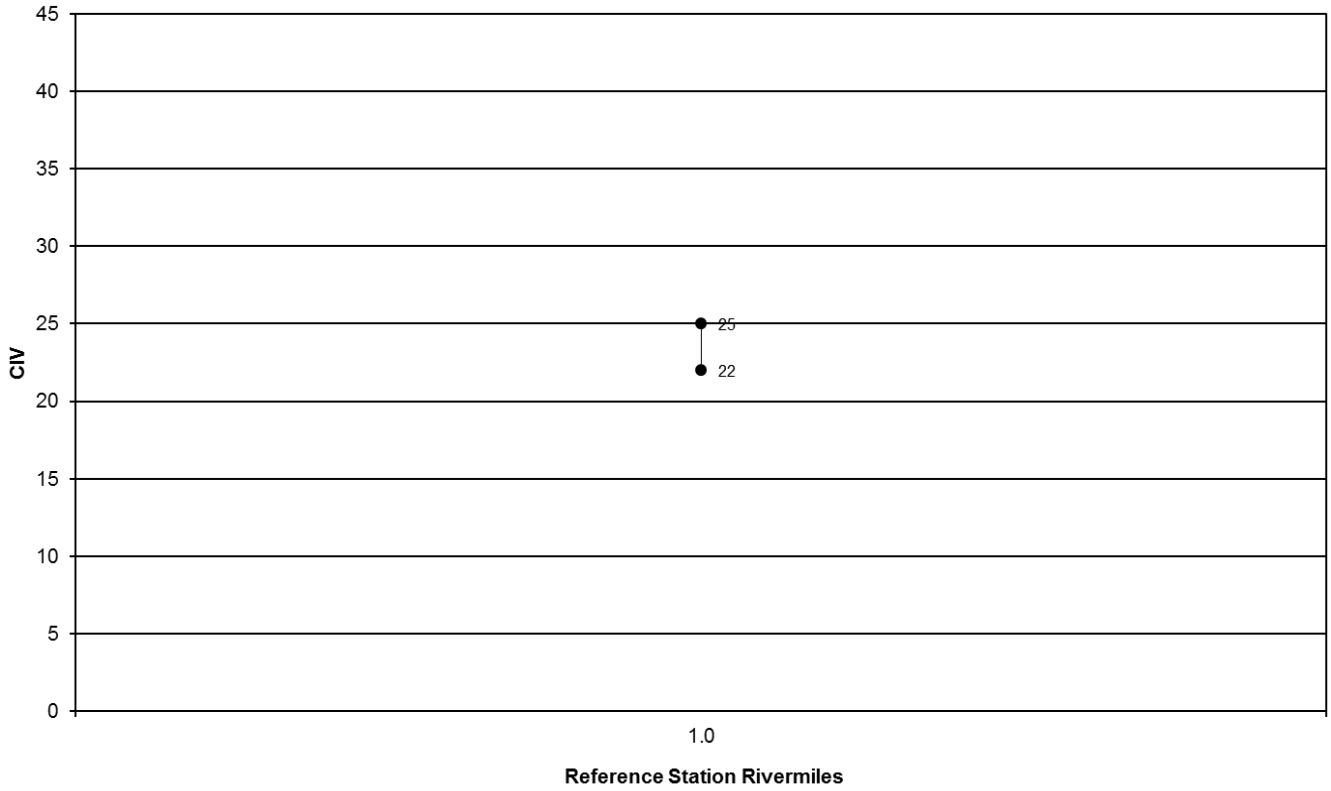


Figure 2.2 Little Beaver Creek - Bull Creek 2003 – 2013 Mean CIVs

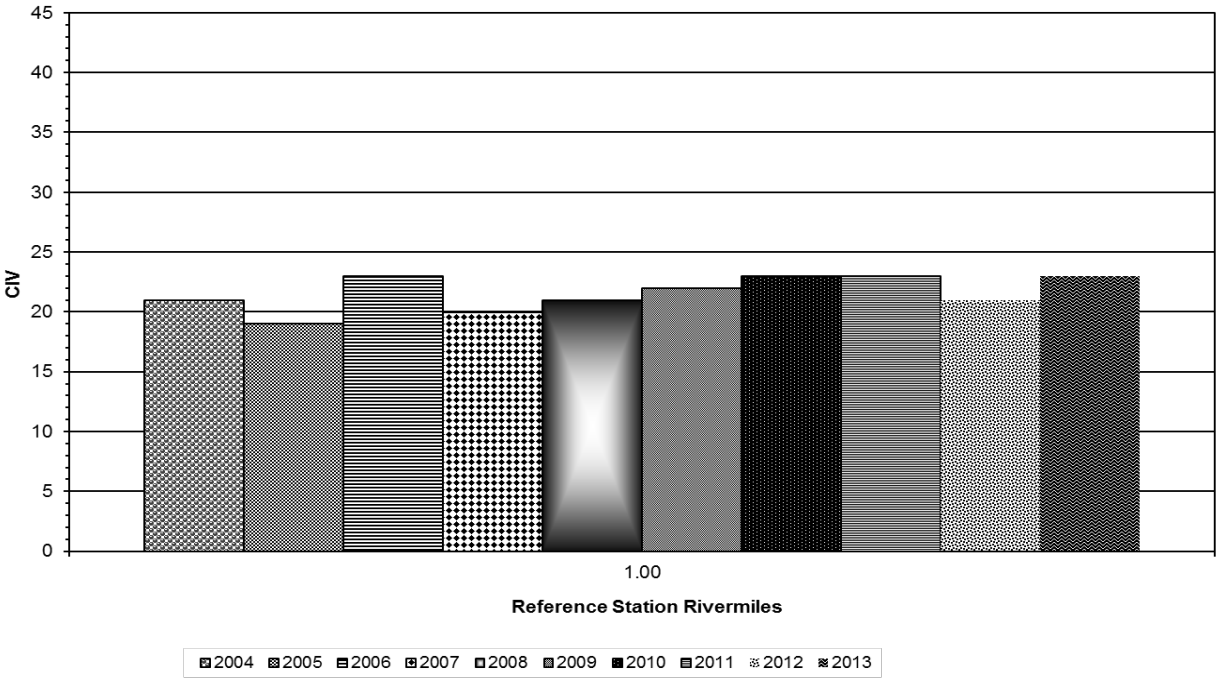


Figure 1.3 Little Beaver Creek - Leslie Run 2013 Maximum and Minimum CIV Range

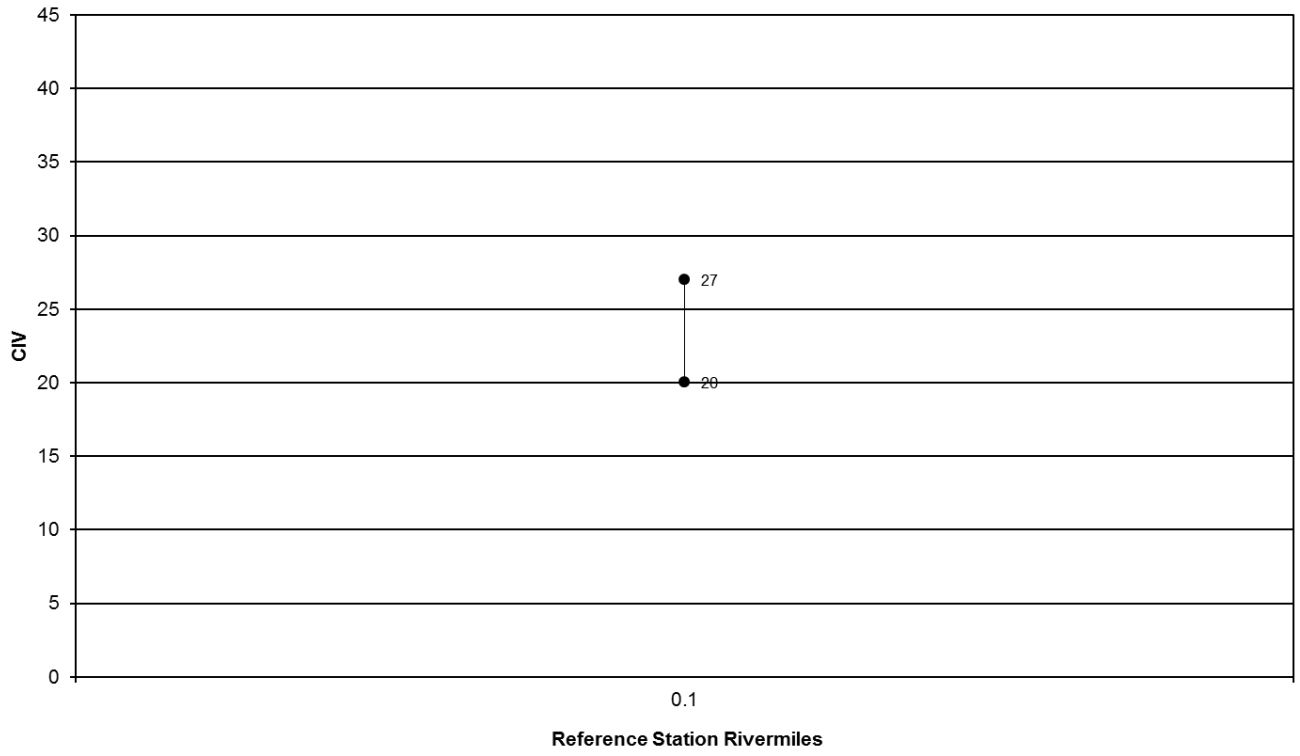


Figure 2.3 Little Beaver Creek - Leslie Run 2003 – 2013 Mean CIVs

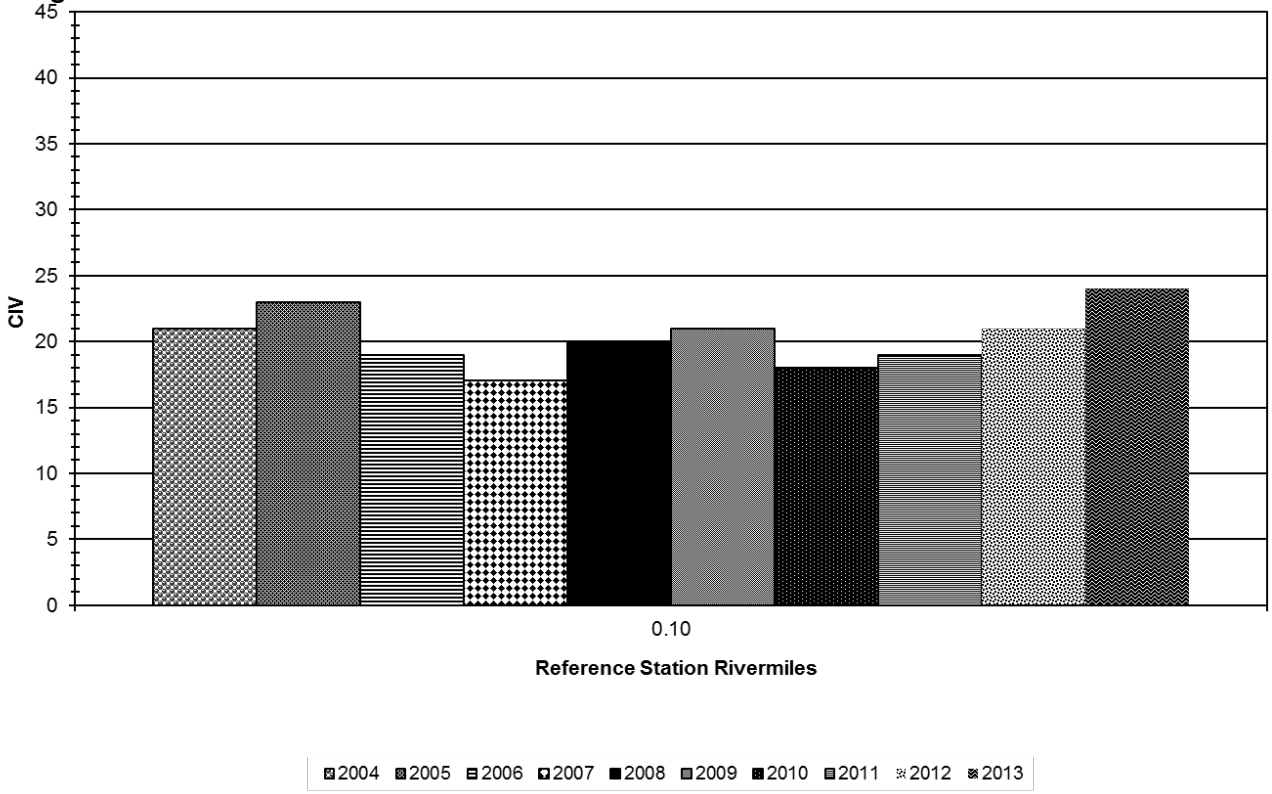


Figure 1.4 Little Beaver Creek - North Fork 2013 Maximum and Minimum CIV Ranges

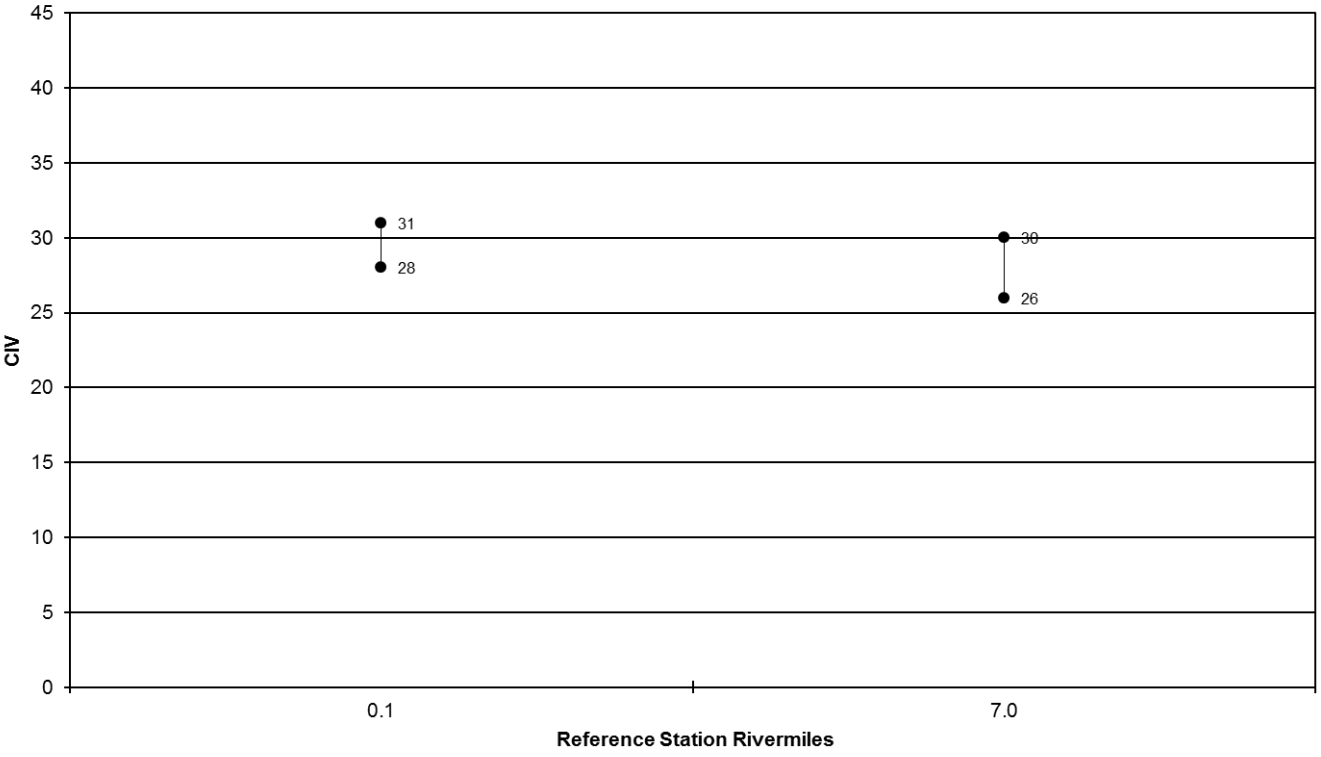


Figure 2.4 Little Beaver Creek - North Fork 2003 – 2013 Mean CIVs

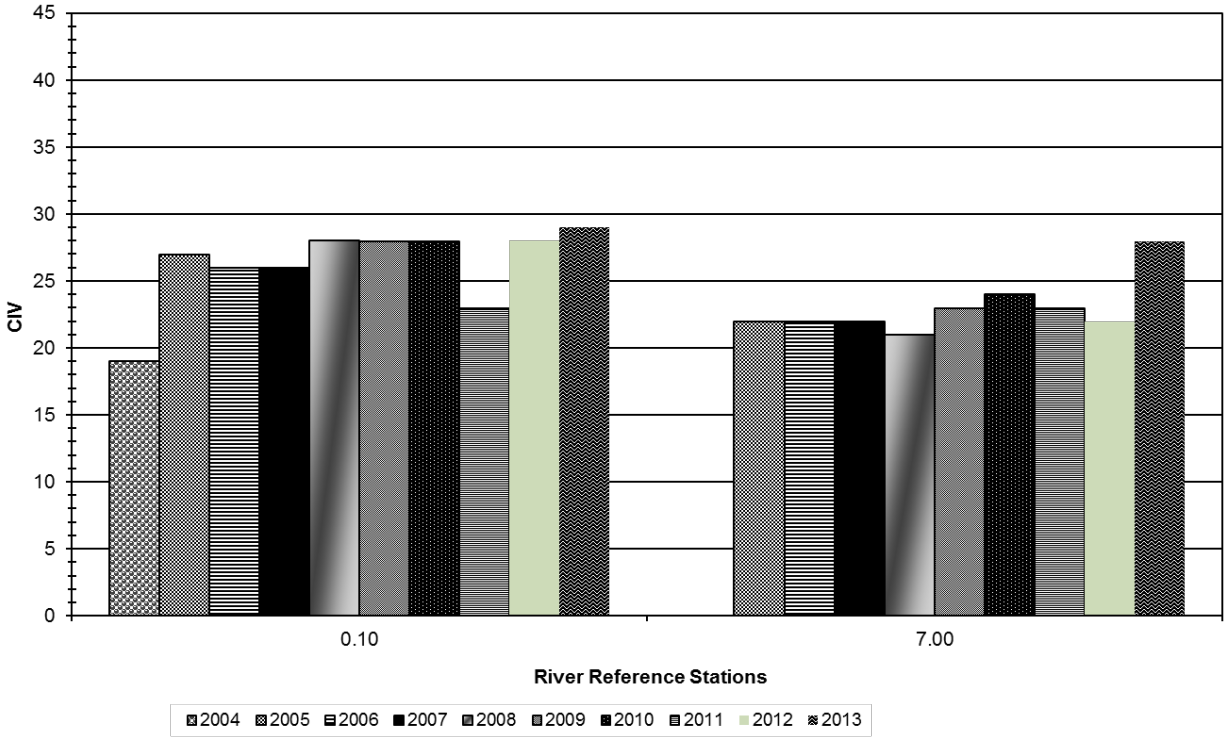


Figure 1.5 Little Beaver Creek - West Fork 2013 Maximum and Minimum CIV Ranges

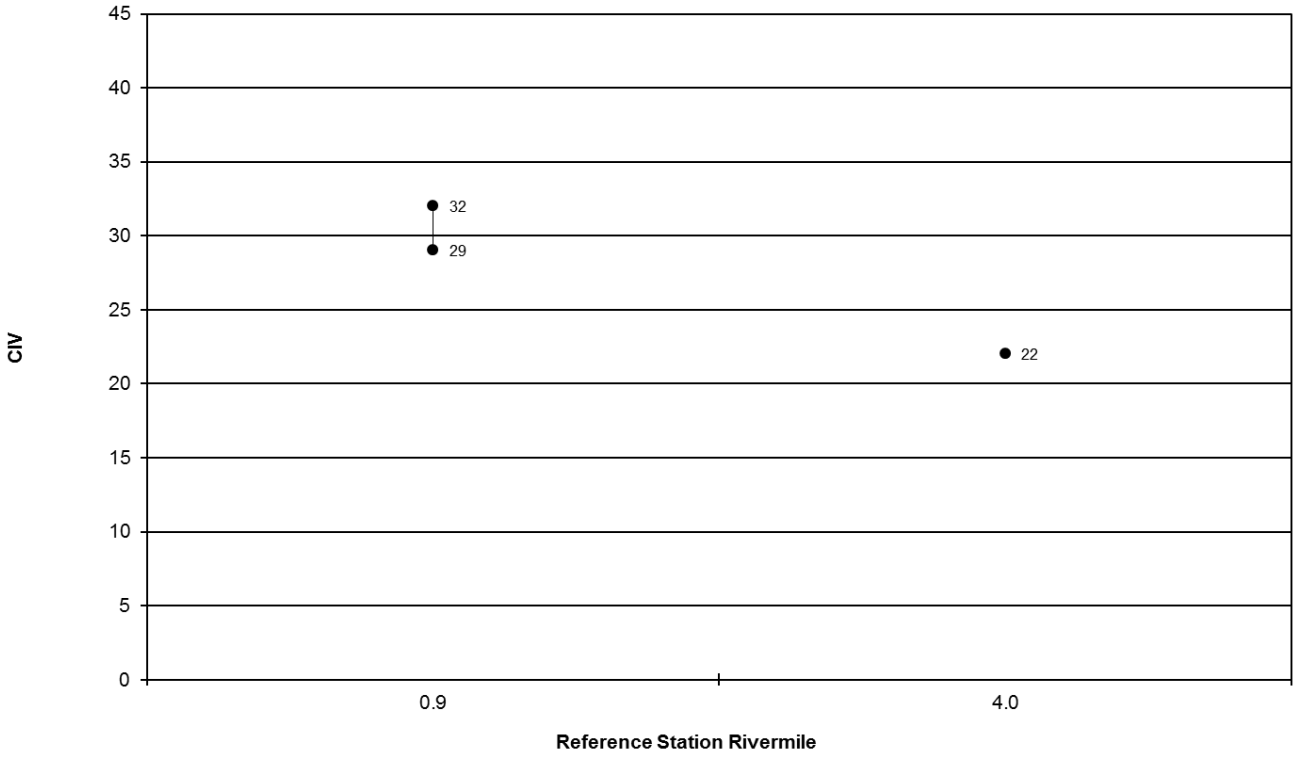
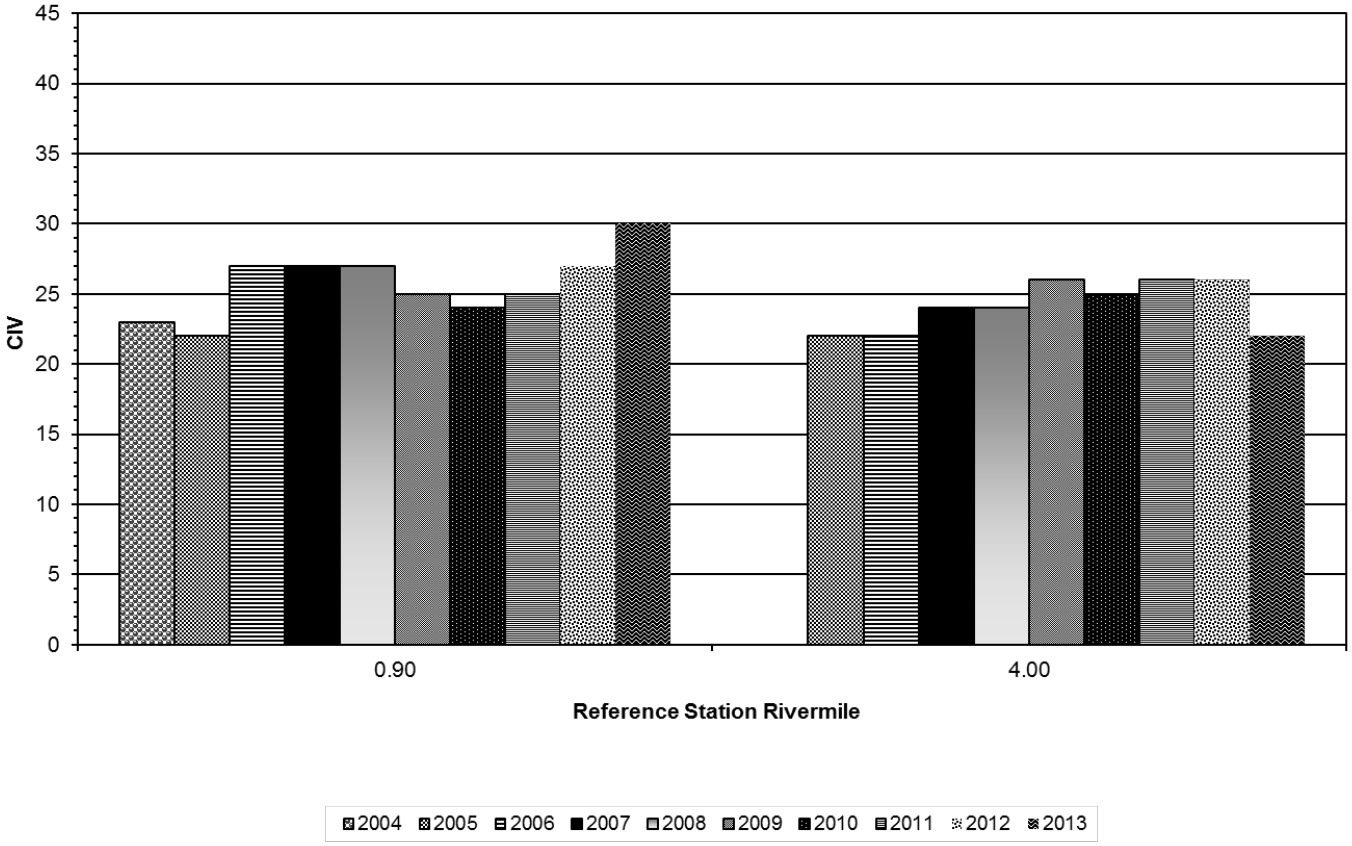


Figure 2.5 Little Beaver Creek - West Fork 2003 – 2013 Mean CIVs



Qualitative Habitat Evaluation Index (QHEI)

The Qualitative Habitat Evaluation Index (QHEI) is a system developed and employed by the Ohio Enironmental Protection Agency (OEPA) to measure physical habitat conditions in and around rivers and streams in Ohio. During 2013, the Ohio SQM Program staff conducted the QHEI to gather measurements at reference stations on several of Ohio's scenic rivers. It is anticipated that such measurements will become yet another annual tool that will be used to monitor habitat and water quality conditions on all Ohio scenic rivers.

Habitat conditions are re-evaluated every five years. SQM staff and volunteers are scheduled to perform evaluations next in 2018. Until then, results from 2013 QHEI are included below. When attempting to interpret this data, it is important to recognize that OEPA generally concludes that any site receiving a QHEI value greater than 60 meets current warm water habitat (WWH) standards. Meeting WWH standards suggests that such locations should be adequate for supporting reproducing communities of fish and macroinvertebrate life. Sites attaining QHEI scores of greater than 80 are generally believed to contain exceptional habitat conditions for warm water communities.

The following tables have been prepared to assist with determining the relationship between habitat conditions, measured by the QHEI, and macroinvertebrate community performance, measured by the Cumulative Index Value, at each of the reference stations on selected rivers.

Table 7. Little Beaver Creek - Mainstem 2013 QHEI and SQM Assessment Data

Reference Station	QHEI	2013 Average CIV	SQM Assessment
RM 4.6	76	X	Excellent
RM 14.3	84	26	Excellent

Table 8. Little Beaver Creek – Leslie Run 2013 QHEI and SQM Assessment Data

Reference Station	QHEI	2013 Average CIV	SQM Assessment
RM 0.1	76	23	Excellent

Table 9. Little Beaver Creek – Bull Creek 2013 QHEI and SQM Assessment Data

Reference Station	QHEI	2013 Average CIV	SQM Assessment
RM 1.0	74	23	Excellent

Table 9. Little Beaver Creek – North Fork 2013 QHEI and SQM Assessment Data

Reference Station	QHEI	2013 Average CIV	SQM Assessment
RM 0.1	78	29	Excellent
RM 7.0	96	X	Excellent

Table 10. Little Beaver Creek – West Fork 2013 QHEI and SQM Assessment Data

Reference Station	QHEI	2013 Average CIV	SQM Assessment
RM 0.9	90	30	Excellent
RM 4.0	82	X	Good

Appendix

2013 Data by Monitoring Station

2013 CIVs by Monitoring Station
LITTLE BEAVER CREEK

RM	DATE	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
4.60	8/23/2013	B	B	B		C	A	B				A	A				B		C			24
4.60	10/24/2013	B	B	B	A	B	A	A				A		A			A		A			27
11.60	6/24/2013	B	B	B	A	C	B		A			B	A		B			A	B			28
11.60	8/28/2013	B	B	A		B	B		B						A		A		B			21
14.30	5/20/2013	A	B	B		B	A		A				A		A			A	B		A	24
14.30	5/23/2013	B	B	B		B		A	A	A	A		A	B	B							27
14.30	6/18/2013	C	C	B		C	A	B	A	A		B	A		B				A			29
14.30	8/4/2013	A	A	A		B		A		A	A		A		A							23
14.30	8/4/2013	A	B	B	A	C	A	A	A			A	A		B		B		C			31
14.30	9/4/2013	B	B	B	A	B		A					A		A							22

2013 CIVs by Monitoring Station
LITTLE BEAVER CREEK-BULL CREEK

RM	DATE	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
1.00	5/30/2013	B	A	B	A	A	A		B				A					A				23
1.00	8/22/2013	B	B	A	A	A				A	A		A					A				22
1.00	9/18/2013	A	B	A	A	B			A	A	A		A					A	B			25

2013 CIVs by Monitoring Station
LITTLE BEAVER CREEK-LESLIE RUN

RM	DATE	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
0.10	6/5/2013	A	A	B		B	A				A	A	A			A	A	B	B		A	27
0.10	8/18/2013	A	B	A	A	B	A				A	A	A					A	B			26
0.10	10/14/2013	A	A	A	A	B				A	A							A				20

2013 CIVs by Monitoring Station
LITTLE BEAVER CREEK-NORTH FORK

RM	DATE	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
0.10	6/24/2013	B	A	B	A	C	B	A	A			B			A			A	A			29
0.10	8/28/2013	B	B	B		B	B				A	A	A	A	A		A	A	B			28
0.10	10/24/2013	A	B	B	A	B	A	A		A	A	A	A				A		A			31
7.00	8/15/2013	B	C	B	A	C	B	B				A	A		A		C	A	B			30
7.00	10/24/2013	A	C	B	A	C		A				A	A		A		A		B			26

2013 CIVs by Monitoring Station
LITTLE BEAVER CREEK-WEST FORK

RM	DATE	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
0.90	6/24/2013	B	B	A	A	C	B	A	A			B	A		A		A	A	B			32
0.90	8/7/2013	B	A	A	A	B	A	A	A			A	A	A	A							31
0.90	8/29/2013	B	B	A		B	B	A	A		A	A		A			A	A	B			29
0.90	10/13/2013	A	B	A	A	B		A		A	A		A	A	A		A					29
4.00	10/24/2013		C	B	A	B					A	A	A		A		A		A			22

2013 CIVs by Monitoring Station
LITTLE BEAVER CREEK-MIDDLE FORK

RM	DATE	WP	MF	ST	DO	CD	RI	OS	DA	DR	CR	BL	CF	SC	CL	SW	BF	AW	MI	PS	LE	CIV
4.70	8/17/2013		B	A		B	B		A	A		B	A		A				B			23
4.70	10/20/2013		B		A	C	B				B	B			A				B		A	20